

Work with perchloric acid requires special care. The Iowa State University Chemical Hygiene Plan has prescriptive requirements for work with chemicals.

## **KNOW THE HAZARDS OF THE MATERIALS YOU ARE USING.**

All research activities at Ames Laboratory require approval by the Safety Review Committee. The procedure used for this approval is **READINESS REVIEW**. Make sure the activity you are working on has been approved via the Readiness Review procedure and that you are authorized to be performing work. Ask your supervisor.

Here are some general recommendations for work with perchloric acid

# **PERCHLORIC ACID**

## **Personal Protection**

**Eye Protection:** Chemical-resistant splash goggles that are also impact resistant.

**Gloves:** Polyvinyl chloride (PVC)

**Ventilation:** Use in a hood with at least 100 fpm face velocity. If process involves heating or fuming, a dedicated, perchloric-acid hood shall be used.

**Respirator:** May be required if large volumes are being used or the acid has the potential to be volatilized. Use a NIOSH-approved respirator with an acid mist

cartridge. Consult with ESH&A for appropriate equipment.

**Clothing:** Lab coat to protect you and your clothing. An apron is recommended if the perchloric acid used is in a concentrated form.

## **First Aid**

Wash any exposed areas of skin with large volumes of water.

If eye contact has been made, flush eyes in eye wash for 15 minutes.

Contact Occupational Medicine, G11 TASF, if an exposure has occurred.

## **Handling Precautions**

- ◇ Use the smallest amount of reagent possible to complete the experiment.
- ◇ Solutions containing perchloric acid should be cooled whenever possible (e.g. during electropolishing).
- ◇ Accidental formation of anhydrous perchloric acid is possible through evaporation or dehydration of the acid. In this form, **THE ACID IS EXPLOSIVE!!**
- ◇ Reduction of organic material should first be done with nitric acid followed by a mixture of nitric and perchloric acid.

**Avoid contact** of perchloric acid with the following chemicals:

- \*Sulfuric Acid
- \*Phosphorous Pentoxide
- \*Alcohol
- \*Glycerol
- \*Hypophosphites
- \*Acetic Anhydride
- \*Bismuth and its Alloys
- \*Combustible Materials like Paper and Wood

## **Storage/Disposal**

- Store perchloric acid under fire resistant conditions in a metal cabinet.
- Do not store perchloric acid with organic materials.
- Stored perchloric acid should be inspected monthly for discoloration. If the acid is discolored, contact ESH&A for removal.
- Perchloric acid solutions are **CORROSIVE** and need to be disposed of by contacting ESH&A.

- If perchloric acid has been used to oxidize organic material, the waste is also REACTIVE. Additional precautions are necessary for disposal of this material.
- Contact ESH&A at 4-2153 for pick-up of waste perchloric acid solutions.



At normal temperatures, perchloric acid acts as a **non-oxidizing** acid.



At elevated temperatures, perchloric acid acts as an **oxidizing** acid.

### **Spill Remediation**

Dilute spills to prevent the formation of anhydrous perchloric acid. Use an inert, inorganic absorbent to soak up spills of perchloric acid.

Contact ESH&A, 4-2153, for assistance in spill remediation.

Notify your supervisor of any spill that has occurred.

### **Physical Properties**

CAS#:	7601-90-3
Formula:	HClO <sub>4</sub>
Color:	Water white liquid fuming, oily liquid
Odor:	None
Boiling Point	203° C
Density	1.664, 70% solution

### **Shipping Description**

Concentrations > 72% are forbidden for transport.

Concentrations 50-72%:

Perchloric Acid, 5.1, Oxidizer, Corrosive, UN1873

Concentrations < 50%

Perchloric Acid, 8, Corrosive, Oxidizer, UN1802

### **References**

Everett, K. And Graf, F.A. Jr., **Handling Perchloric Acid And Perchlorates**, in Handbook of Laboratory Safety, 2<sup>nd</sup> Ed., Steere, N.V., Ed., CRC Press, Boca Raton, FL 1971, p. 265.

Schilt, A. A., Perchloric Acid And Perchlorates, G. Frederick Smith Chemical Co., 1979.

Merck Index, 11<sup>th</sup> ed., Abstract 7110

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# Handling Of

# **P**erchloric **Acid**

Not intended to replace the  
Material Safety Data Sheet